PURESTREAM
CWT CHILLERS
BY FRIULAIR

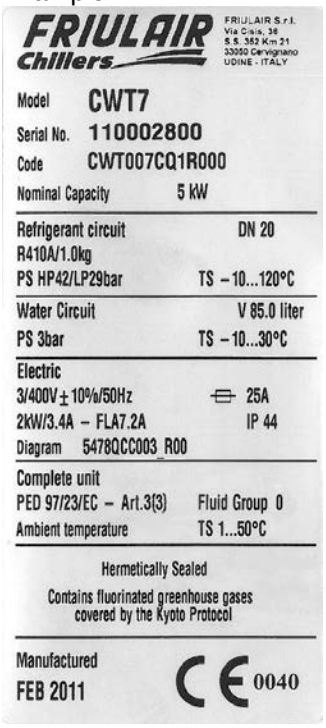
USER AND MAINTENANCE MANUAL

Air cooled liquid chillers
R410A refrigerant
Cooling capacity 2.1 – 32.2 Tons, scroll and rotary compressors
60 Hz

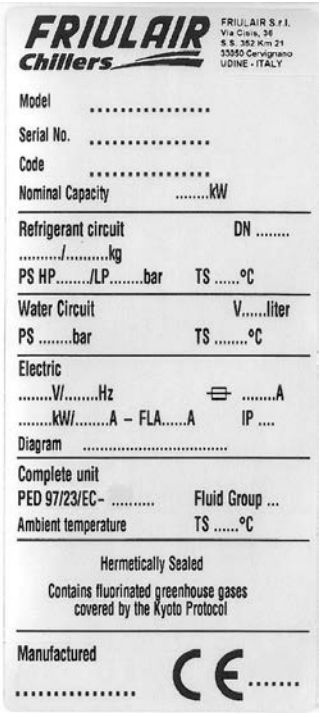
Dear Customer,

Thank you for the trust you have placed in us. Please read this manual carefully to obtain the best performance from our product.
In order to avoid incorrect operating conditions and danger for the operators, it is essential that you follow the directions meticulously as well as the current accident-prevention laws in the country of use.
Each **CWT** chiller is rigorously tested before being packed.
This verifies that there are no manufacturing defects and that the machine performs correctly the functions for which it was designed.
This manual must be kept for future reference and is an integral part of the chiller you have purchased.
Due to continuous technical development, we reserve the right to make the necessary modifications without any obligation to give advance notice.
Do not hesitate to contact us if you have any problems or need more information.
The product identification plate, located on the side of the chiller, contains all essential information about the machine.
During installation, fill in the table below, copying the data on the identification plate.
You will have to give this data to the manufacturer, or reseller, whenever you request information, replacement parts, etc., during the warranty period.
Removing or tampering with the identification plate will void the warranty.

Example



Fill in this identification plate



Warranty conditions:

For 12 months from the commissioning date, and no more than 14 months from the shipping date, any parts that were originally defective will be repaired or replaced at no charge. Expenses for transport and travel, room and board for our technicians are excluded.
The warranty excludes any liability for direct or indirect damage to persons, animals and/or property that are caused by incorrect use or inadequate maintenance and is exclusively limited to manufacturing defects.
The right to service under the warranty is secondary to your faultless observance of the installation, use and maintenance instructions in this manual.
The warranty will be voided immediately if the chiller is modified or tampered with, even slightly.
When requesting warranty service, you must provide the data on the product's identification plate.

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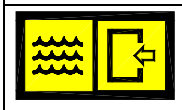
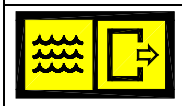
1.0 Safety rules

1.1 Definitions of the symbols used

	Read this use and maintenance manual carefully before performing any repairs on the chiller.
	Warnings of a general character; risk of danger or possibility of damaging the machine, pay particular attention to the phrase following this symbol.
	Risk of electrical danger; the phrase highlights conditions that could be fatal. Follow the instructions provided meticulously.
	Risk of danger; component or system under pressure.
	Risk of danger; component or system that can reach high temperatures during operation.
	Risk of danger; it is absolutely forbidden to use water to extinguish fires near or on the chiller.
	Risk of danger; it is absolutely forbidden to operate the machine with the panel open.
	Service that can be performed by the machine's operator, if qualified (1).
	Water input connection point.
	Water output connection point.
	Dispose of each type of material in accordance with the requirements of the country of use.
NOTES:	Phrases to be emphasized that do not contain safety rules.
	This chiller has been carefully designed and constructed to be environmentally friendly: • Refrigerants without CFC. • Expanded foam insulation without CFC. • Energy-saving techniques. • Reduced noise. • The chiller and its packing materials are recyclable. In order not to hinder our efforts, the user is required to obey the simple ecological warnings indicated by this symbol.

(1) These are persons with the experience, technical preparation and knowledge of standards and regulations who are qualified to perform the necessary actions and able to recognise and avoid possible dangers while handling, installing, using and maintaining the machine.

1.2 Warnings

Only qualified persons may use and maintain electrically-powered equipment. You must obey the following rules before carrying out maintenance:

Make sure that no part of the machine is under voltage and that it cannot be reconnected to its power supply..

These chillers contain R410A refrigerant fluids. Service of the chilling circuit must be performed by specialised personnel using satisfactory tools.

In addition to creating dangerous situations, any alterations to the machine or its operating parameters that have not been checked and authorised by the manufacturer in advance, will void the warranty.

Do not use water to extinguish fires near or on the chiller.

1.3 Proper use of the chiller

CWT units are monobloc water chillers with air-condensation.
They are intended for use in industrial process or air-conditioning systems requiring chilled water.
Any other use is considered improper.
The manufacturer is not liable for damage resulting from inappropriate use; in all cases, the user is liable for any resulting hazards.

Proper use requires conforming to the installation conditions and, in particular:

- power voltage and frequency;
- pressure, temperature and flow-capacity of the incoming water;
- surrounding temperature.

The chiller has been tested and completely assembled. The user must only make the connections to other systems, as described in the chapters that follow.

1.4 Instructions for using equipment under pressure conforming to PED Directive 97/23/EC

The proper use of equipment under pressure is an essential prerequisite for ensuring safety.

To this end, the user must proceed as follows:

1. Use the equipment properly within the temperature limits shown in the operating limits stated on the manufacturer's name/data plate.
2. Do not solder on the exchangers or refrigerant fluid pipes.
3. Do not install the equipment in insufficiently ventilated rooms, areas exposed to sources of heat or near inflammable substances.
4. During operation, the equipment must not be subjected to vibrations that could cause fatigue failures.
5. Keep the documentation attached to the equipment (user manual, declaration of conformity, etc.) for future reference.
6. The maximum working pressure stated on the manufacturer's data plate must not be exceeded. Prior to use, the user must fit safety / pressure relief devices.

2.0 OPERATION AND MAIN COMPONENTS

2.1 Chilling circuit

CWT chillers use a vapour-compression cycle in a chilling circuit that essentially consists of the following components: evaporator, compressor, condenser and thermostatic expansion valve.

Evaporator: this is a braise-welded plate exchanger that exchanges heat between water and a refrigerant fluid without their coming into contact with each other. It consists of corrugated stainless steel plates braise-welded to each other with copper. The evaporator is protected against a lack of water by a differential pressure-switch and against the formation of ice by an anti-freeze system managed by the chiller's electronic controller.

Compressor: this compresses the vapours coming from the evaporator and sends them to the condenser at a higher pressure. CWT chillers use rotary (models 7 and 10) and scroll compressors; they feature a low level of vibration and noise; they are protected by magnetothermic circuit breakers and a temperature sensor in the motor winding.

Condenser: this is a micro-channel exchanger made entirely of aluminium that exchanges heat between the refrigerant and the air; it condenses the refrigerant gas (which flows inside the micro-channel) transferring its condensation heat to the air (which flows outside); this produces refrigerant liquid under high pressure.

Thermostatic expansion valve: this reduces the pressure of the refrigerant liquid coming from the condenser and sends it to the evaporator. This valve modulates the flow of refrigerant in such a way as to maintain the constancy of the superheating of the gas exiting to the evaporator under its various working conditions and, thus ensures that the flow of gas entering the compressor contains no liquid.

Thanks to these components, **the vapour-compression cycle** works as follows: the refrigerant liquid evaporates in the evaporator, chilling the water; the refrigerant vapours are then aspirated from the compressor, which compresses them and sends them to the condenser under high pressure; here, thanks to a flow of forced air from the fans, the high-pressure refrigerant gas is cooled, making it condensed and undercooled.
The flow of refrigerant liquid then passes through the lamination valve (thermostatic expansion valve), which drastically reduces its pressure: the refrigerant liquid returns to the evaporator at a reduced pressure where it again evaporates, taking heat from the water.
The chilling circuit also includes a water **pump**, which ensures the flow of water to be chilled by evaporation, and **fans** that cool the condenser.

2.2 Water circuit

The water circuit mainly consists of: pump, evaporator, tank, and expansion vessel.
The water flows first into the evaporator, where it is chilled, and then to the tank; afterwards it is aspirated by the pump, which sends it to the system.
A differential pressure switch on the evaporator checks that the flow of water is sufficient and stops the compressors if the flow-capacity of the water does not ensure the good functioning of the exchanger.
An automatic vent valve removes any air bubbles in the circuit.
A fine mesh metal filter at the entrance to the machine catches any solid residues that could damage the evaporator.
A calibrated bypass pipe between the output of the pump and the return to the system ensures the minimum flow-capacity for the pump even when the system does not need water.
The unit can be equipped with pumps with different heads (see systems with pumps P3 or P5).
A manometer and safety valve complete the unit's water circuit.

2.3 Fans

The fans force air through the condenser's fins to remove the heat from the condensation of the refrigerant gas, thus limiting the pressure inside the condenser.
CWT chillers use external-rotor axial fans with thermal protection inside the motor winding.

2.4 Condensation control

When the temperature of the surrounding air drops, the cooling capacity of the air flow is significantly increased, causing the pressure inside the condenser to drop; in order to keep this drop of the condensation pressure from falling below the tolerable limit for the good functioning of the chilling circuit, the fans slow their rotation, reducing the flow of air.
The speed is controlled by an electronic regulator based on the condensation pressure; this allows the machine to operate properly even when the temperature of the outside air is very low (see Chapter 7.0, Operating Limits) and also maintains a low level of noise with respect to its nominal operating conditions.

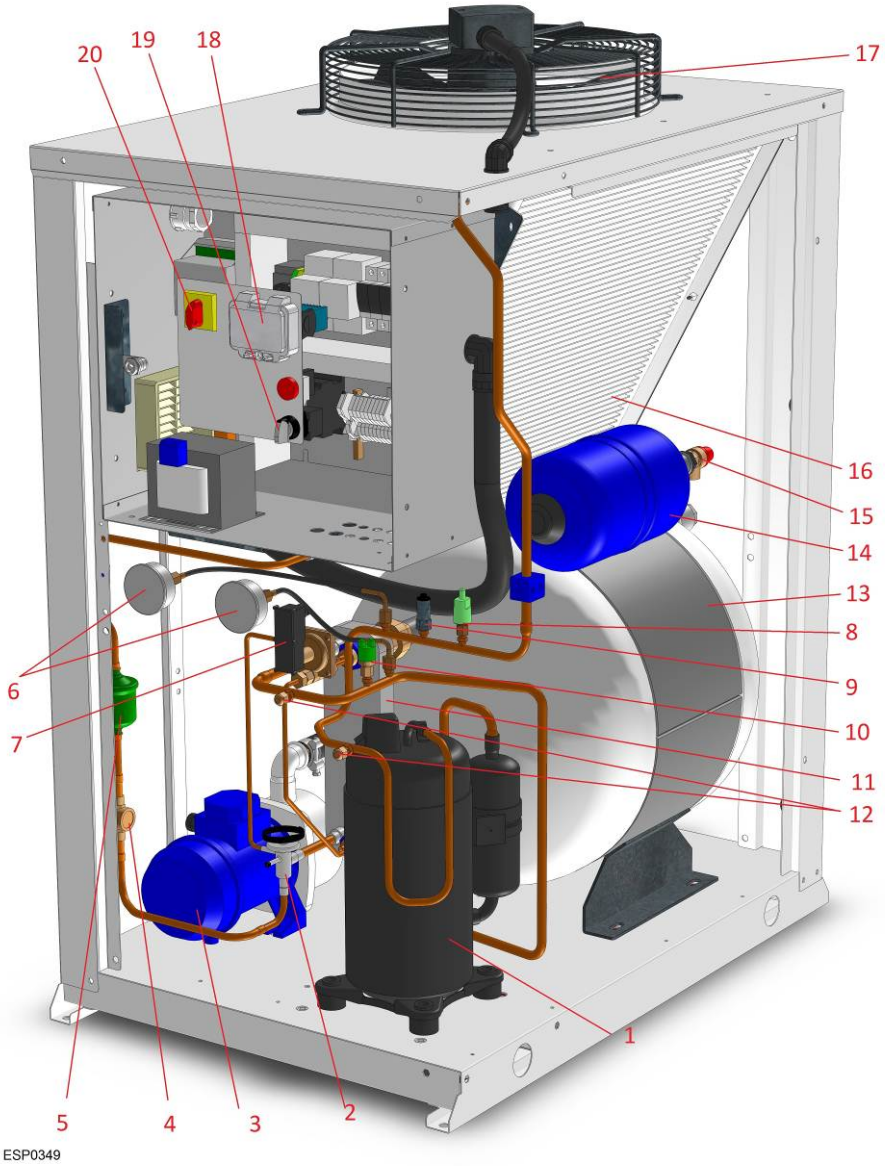
2.5 Control of the water temperature

The purpose of the chiller is to maintain the temperature of the water produced within a desired interval as the load on the system varies; this is handled by an electronic controller and a temperature probe that turn the compressors on and off appropriately (also see paragraph 5.3 Water temperature: dead-zone regulation)

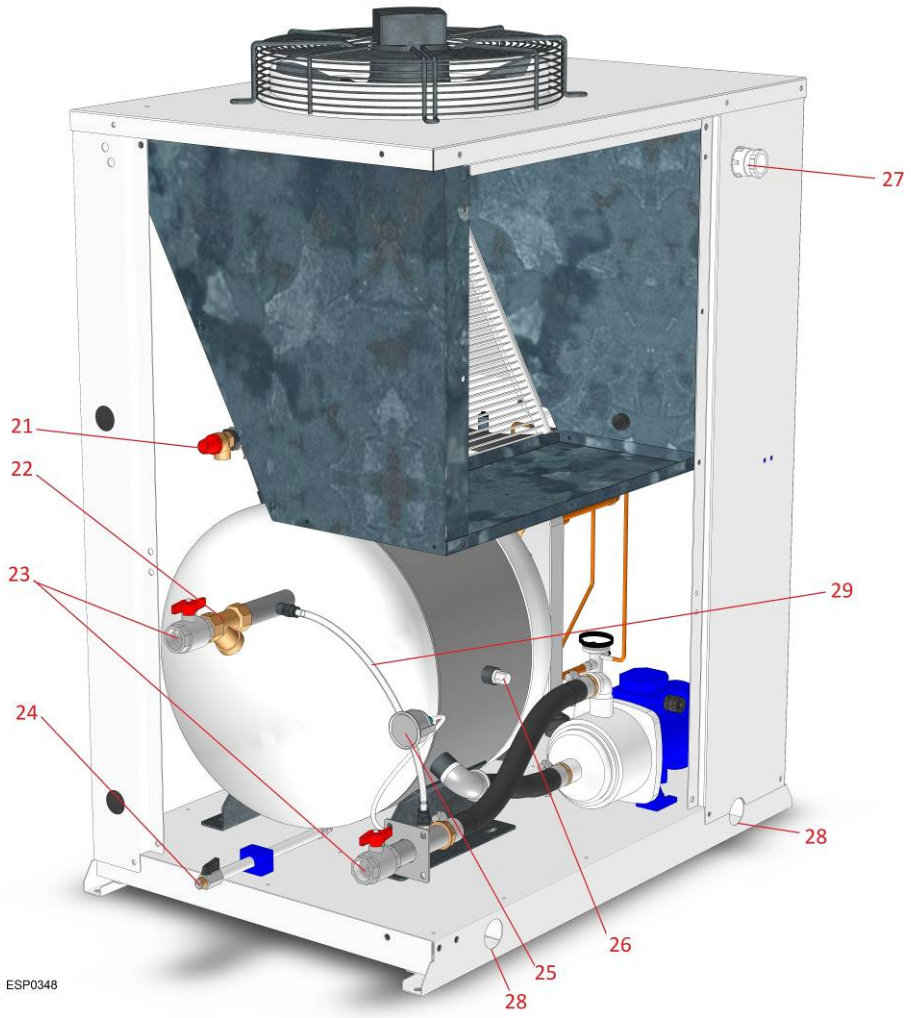
2.6 Protecting the integrity of the machine

In addition to controlling the temperature, the electronic controller uses pressure switches, thermostats and timers to prevent and handle situations that could compromise the integrity of the machine (also see Chapter 6.0, Safety Devices).

2.7 CWT units: identification of the main components



1	Compressor	11	Evaporator
2	Thermostatic valve	12	Refrigerant service inlets
3	Pump	13	Accumulation tank
4	Liquid peep hole	14	Expansion vessel
5	Refrigerant filter	15	Water safety valve
6	Manometers	16	Condenser
7	Water differential pressure switch	17	Fan
8	High-pressure pressure switch	18	Electronic controller
9	Pressure transducer	19	Remote on-off switch
10	Low-pressure pressure switch	20	Electrical panel cut-off switch



21	Water safety valve	26	Level sensor
22	Water Filter	27	Power input
23	Water taps	28	Lifting holes
24	Drain tap	29	Water bypass
25	Water manometer		

3.0 INSTALLATION

3.1 Transport

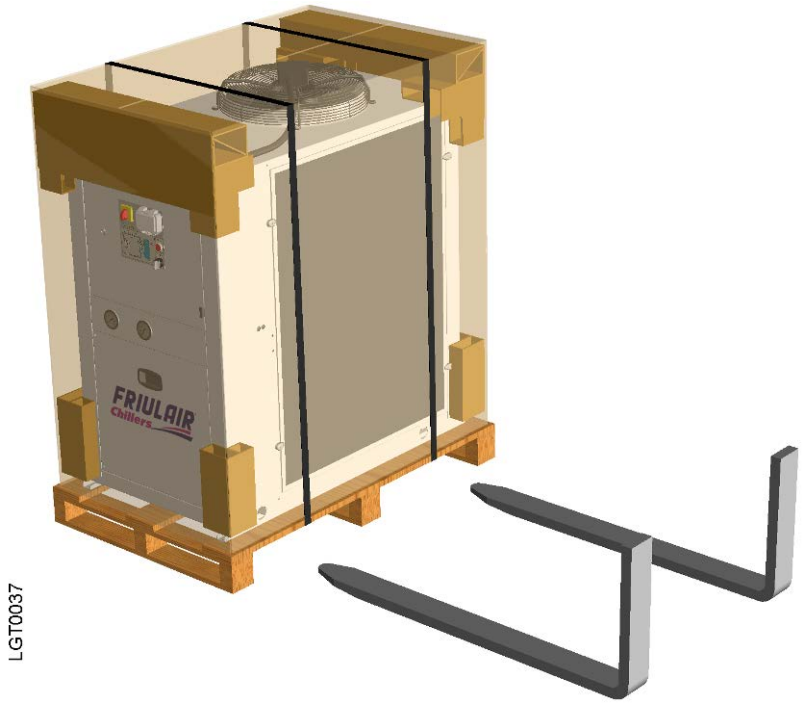
The units are supplied packed in a cardboard box on a wooden pallet.
After checking that the packing is undamaged, position the unit near the installation site and unpack it.

Always keep the chiller vertical: turning it upside down can irreparably damage several parts of the unit.

Handle with care. Violent falls can cause irreparable damage.
The units can be handled using tubes and belts or a forklift truck.

3.1.1 Handling the unit with a forklift truck or pallet jack

The centre of the machine is approximately its centre of gravity. In any case, when handling the machine with a forklift truck or pallet jack, always check its stability before lifting.



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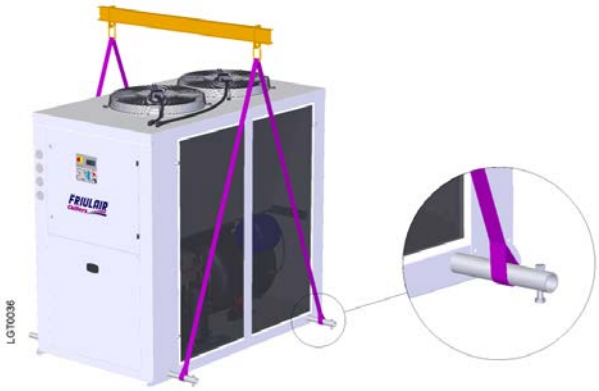
3.1.2 Lifting with belts and tubes

All units have holes in the base to house the lifting tubes
Use steel tubes with a diameter of 1¼" and at least 3 mm // 0.11 inch - thick and long enough to project at least 250÷300 mm // 10÷12 inch from both sides of the machine's profile.

Lock the belts so that they won't slip off during lifting (see figure).



3.2 Storage

Protect the machine from bad weather, even if packed.
Always keep the chiller vertical, even when in storage. Turning it upside down can irreparably damage several parts of the unit.
If not used, the chiller can be stored packed in an enclosed place, free of dust, with a maximum temperature of 50 °C // 122°F and specific humidity of no higher than 90%.

The packing material is recyclable.
Dispose of each type of material in accordance with the requirements in the country of use.

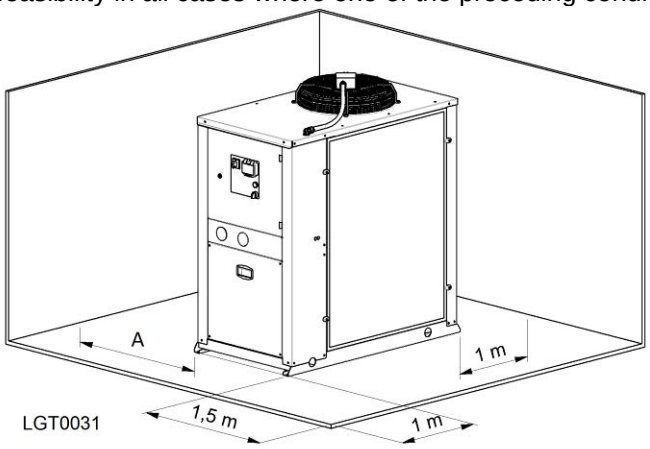
3.3 Place of installation

The CWT unit can be installed either inside or outside.
To determine the best place to install the unit, it is important to consider the following aspects:

- the dimensions and source of the water pipes;
- the location of the electricity;
- the solidity of the support surface;
- avoid any obstacles to the flow of the fan which could cause the recirculation of air to the condenser.
- avoid the possible reflection of sound waves: (do not install in narrow or tight spaces).
- provide access for maintenance or repair (see paragraph 3.3.1, "Installation spaces").
- The air temperatures in the area selected for installation (see Chapter 7.0, Operating Limits)
- - Attention: if the machine is installed outside, it could find itself at a temperature lower than 0 °C // 32°F , when stopped; the formation of ice could damage the evaporator. If you do not intend to drain the machine during the winter, you must add anti-freeze to the water circuit (see paragraph 3.4.2, Use of ethylene glycol as a winter anti-freeze)

3.3.1 Installation spaces

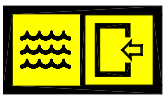
To ensure the good functioning of the unit and access for maintenance, you must respect the minimum installation space shown in the figure in this paragraph.
The exit of air from the fans must not be obstructed.
In any case, avoid all situations in which hot air can circulate between the output of the fans and the intake of the machine.
Contact our office to verify feasibility in all cases where one of the preceding conditions cannot be met.

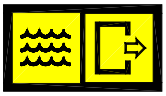


Model	A
CWT 7÷15	0.8 m // 32 inches (access for maintenance)
CWT 18÷130	1.5 m // 60 inches

3.4 Water connections

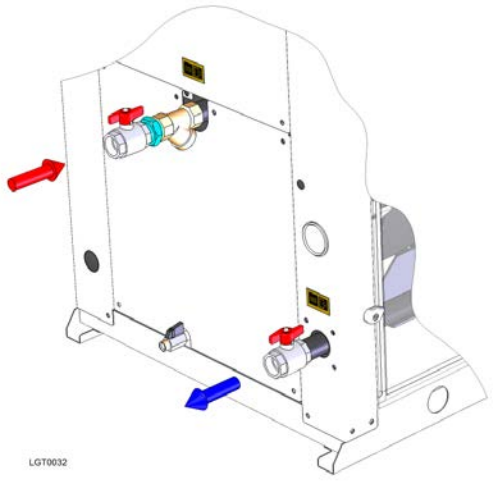
Connect the machine to the water pipes following the instructions located near its water fittings (see figures)


Water input to the machine


Water exit from the machine

Use the input and output taps provided with the machine: they allow the machine's maintenance without emptying the entire system or emptying the machine during the winter.

Important! Install the mechanical water filter, provided with the machine, on its input: scum and impurities can seriously damage the evaporator.



Diameters of the water fittings			
CWT models	007÷030	038÷065	075÷130
Diameter of the in/out water fittings	1" FF	1½ " FF	2" FF

NOTE It is a good rule that the diameters of the arriving and departing pipes be not less than the water fittings.

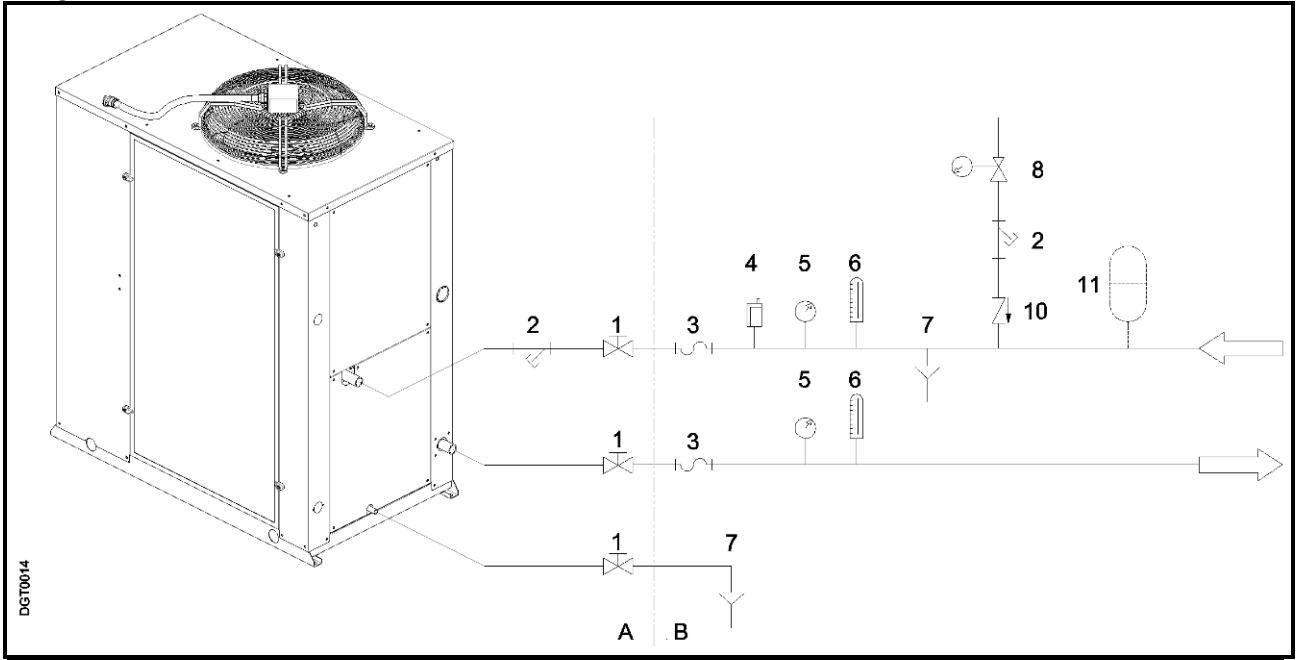
We recommend an extraordinary cleaning of the mechanical water filter after the machine has been running for the first week (also see Chapter 8.0, Maintenance and periodic inspections).

3.4.1 Recommended water system

The standard equipment provided with CWT units includes tank, pump, expansion vessel, safety valve, filter, shut-off taps and automatic vent valve; however, we recommend that the water circuit also be equipped with:

- a mechanical filter and a check valve upstream from the charging tap;
- an air vent at the highest point of the system;
- a drain tap in the lowest point of the system;
- manometers and thermometers at the machine's water input and output to check its functioning;
- vibration damping joints on the pipes to avoid the transmission of vibration to the system.
- In the case of water circuits with considerable capacity, we recommend checking whether it is necessary to supplement the expansion vessel already on the unit with another additional one.

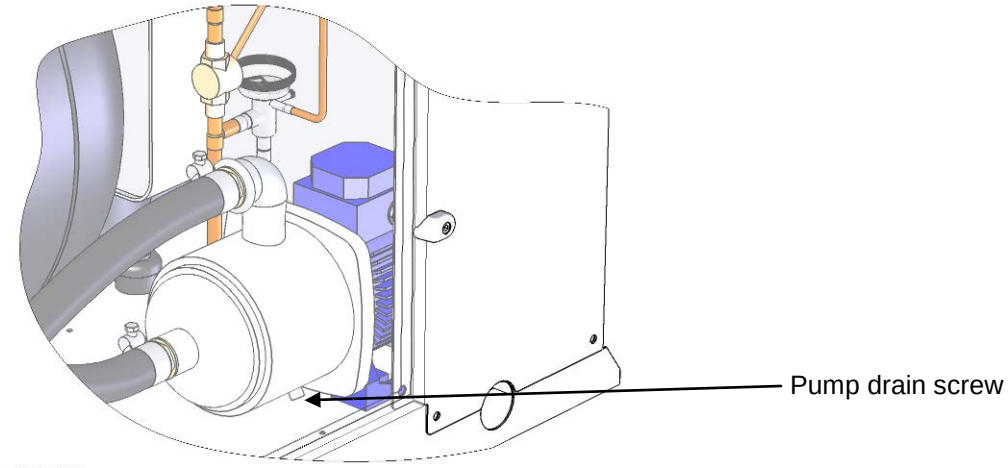
Diagram of the recommended water circuit



Key			
1	Knob	7	Unload
2	Mechanical filter	8	Filling unit
3	Vibration-damping joint	10	Check valve
4	Vent valve	11	Expansion vessel (if any)
5	Manometer	A	Components supplied with the machine
6	Thermometer	B	Components supplied by the installer

Attention! Never work with an open flame near or inside the unit when making connections to the water system.

Important! If the machine is stopped during the winter, you must empty the system (or just the chiller) to avoid frost damage; any water remaining in the pump must be drained using the screw on the lower part of the pump housing (see figure).



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3.4.2 Use of ethylene glycol as a winter anti-freeze

Instead of emptying the system in the winter, you can charge the system with a mixture of water and a suitable percentage of ethylene glycol, chosen as a function of the lowest expected temperature of the outside air.

Percentages of ethylene glycol recommended as a function of the expected temperature of the outside air.

Outside air temperature [°C]	0	-5	-10	-12	-15
Outside air temperature [°F]	32	23	14	10,2	5
Percentage of ethylene glycol [%]	10	15	20	25	30

Attention: Maximum concentration of ethylene glycol allowed: 30%.

3.4.2 Charging the water circuit

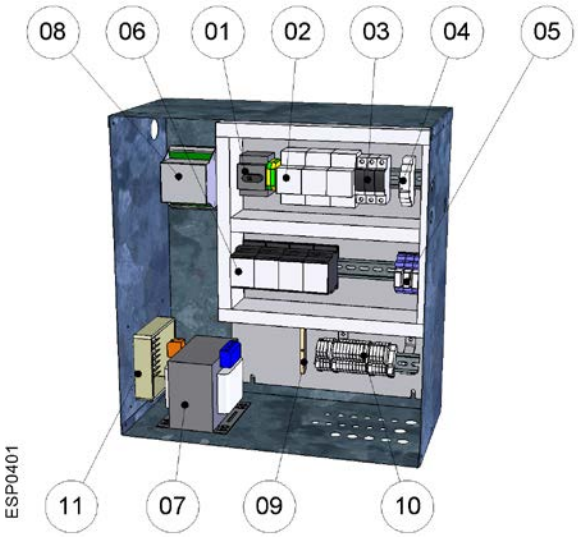
- Check that the drain taps are turned off.
- Open all the system's vent valves.
- Turn on the system's shut-off devices.
- Start filling by slowly turning on the system's water-charging tap.
- When water starts coming out of the vent valves, close them and continue charging until the manometer shows at least 1 bar.
- Check for any leaks by looking at the manometer and inspecting the circuit.

3.5 Electrical connections

The machine must be connected to the electricity following the electrical diagram and conforming to the current laws and regulations in the place of installation

- The voltage, frequency and number of phases must conform to the data shown on the machine's identification plate.
- The power supply voltage must not vary by more than ±10% from its nominal value.
- The frequency must not vary by more than ±1% from its nominal value (±2% for brief periods).
- The imbalance between power phases must be <2%.
- Upstream from the electrical panel, install a differential switch (IDn=0,03A) (main power switch) and slow-blow fuses with the specifications shown on the electrical diagram and in the following table.

Use wires of the section shown on the electrical diagram of the unit.



Example of an electrical panel:

No.	Description	Component ID
1	Cut-off switch	QS
2	Compressor and pump protections	QC1, QC2, etc. QP1
3	Fuses	FU1, FU2, etc.
4	Phase-sequence control relay	RPP
5	Relays	KHP, KRO, KGA
6	Compressor and pump remote switches	KC1, KC2, etc. KP1
7	Transformer	TF
8	Electronic fan-speed regulator	A2, A3
9	Earthing terminal	PE
10	Terminal strip	--
11	Cooling-air intake grill	--

Attention! Never change the internal electrical connections, as the warranty will be immediately voided.

Important! Screw the wires solidly to the terminal strip of the cut-off switch and lock the wire with a cable-gland.

Important! Make the cable entering the machine enters the cable-gland from below: this prevents rain from dripping inside the machine

Important! The earth connection is obligatory: connect the earth wire to the terminal provided in the electrical panel (see the figure of the electrical panel in this paragraph).

The ground wire must be longer than the other wires so that it will be the last one to be pulled if the device holding the cable loosens.

3.5.2 Connecting a remote on/off switch

A remote on/off switch can be connected to terminals X2.13 and X2.14 of the terminal strip in the electrical panel: there are 24V between these two terminals; (consult the electrical diagram).
To enable a remote switch, move the I/O/REM switch to REM.

3.5.3 Connecting a remote alarm indicator light

An alarm indicator light can be connected to terminals X2.16, X2.17 and X2.18 (clean contacts) of the terminal strip in the electrical panel (consult the electrical diagram).

4.0 PRELIMINARY CHECKS AND START-UP

4.1 Preliminary checks and preparation for the first start-up

Before starting up the unit, it is a good idea to do the following:

1. Check that the water shut-off valves are open.
2. Check that the pressure shown on the manometer with the pumps stopped is at least 1 bar (for closed water systems).
3. Check that the surrounding temperature is in the range for the machine to function (see Chapter 7.0, Operating Limits).
4. Check that the cut-off on the electrical panel of the machine is open (O position).
5. Check that the run/stop switch (I/O/REM) in the electrical panel is in the O position
6. Check that the mains voltage matches the voltage on the machine's identification plate with a tolerance of ±10%.
7. Close the main power supply switch.
8. Close the cut-off switch on the machine's electrical panel (I position)

This puts the machine under voltage without starting it up.

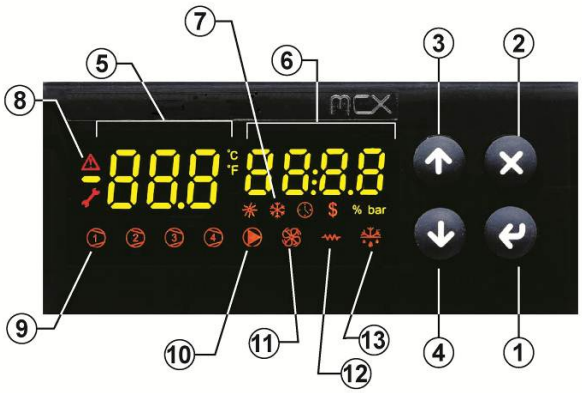
Attention! Apply voltage to the machine at least two hours before start-up to give the heating elements in the compressor housing time to heat the oil inside.

The heating elements limit the quantity of refrigerant dissolved in the oil and prevent the oil from migrating when the compressors start.
Before start-up, check that the temperature of the lower part of the compressors is at least 10÷15 °C //18÷28°F higher than the surrounding temperature.

4.2 Start-up

To proceed to start-up:

1. Move the remote on/off switch (I/O/REM) on the door of the electrical to position 1.
2. Turn the unit on by holding down the "**UP**" ↑ button (3) on the electronic controller for five seconds. The ❄ icon (7) on the display will light up.
3. Check that the alarm symbol (8) does not light up on the electronic controller; if this should happen, press the **X ESC** button to display the type of alarm triggered.



Electronic controller

Attention: at the first start-up there could be an alarm for an incorrect sequence of the R-S-T phases, indicated by the initials AC0 (for CWT models 7÷65) or A02 (for CWT models 75÷130), when you press the **X ESC** button.
This safety system prevents the compressors from turning in the wrong direction.

In this case, turn on the main power supply switch upstream from the machine and reverse the two phases immediately downstream from the main switch.

Attention: never reverse the wires downstream from the cut-off switch on the electrical panel because doing so risks changing the correct sequence of other devices, such as, for example, the pump and fans.

Repeat the steps from point 1.

4. Check that the pump has started (the pump icon (10) lights up) and check the water pressures upstream and downstream from the machine on the manometers previously installed.
5. Wait for the electronic controller to verify that the water flow is constant through the signal from the differential pressure-switch; if the differential pressure-switch intervenes (alarm code A03 when you press the **X ESC** button), vent the system, check that the shut-off taps and the functioning of the pump are turned on; reset the alarm by holding down the **X ESC** button for 5 seconds.
6. Wait for the compressors to start.

4.2.1 Start-up under critical conditions

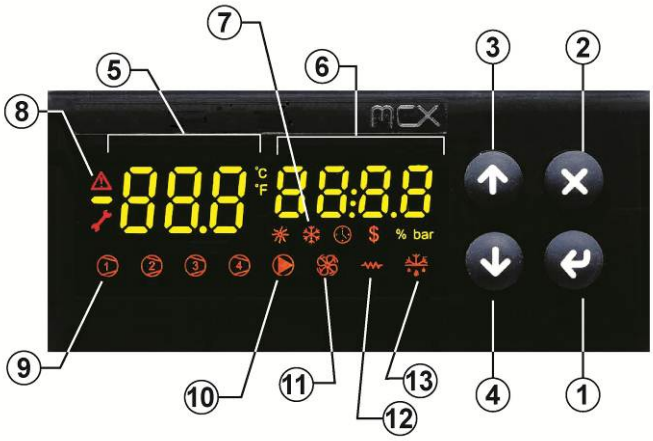
If the temperatures of the water and air are particularly high and outside operating limits, it is possible that the chiller is being asked to work in conditions that are too harsh: in this case, the CWT models with at least two compressors (CWT 25÷130) will partially start, i.e., they will work with only one compressor until the water slowly returns within operating limits; only then will the machine function at full load.
For CWT models with one compressor (CWT7÷20), the consequence of starting up under critical conditions could be the intervention of the high-pressure pressure switch (to rearm the high-pressure pressure switch, see paragraph 6.1 Rearming the high-pressure pressure switch).
To overcome this problem, you will have to reduce the thermal load on the machine by shutting off some of the uses or, if this is not possible, by reducing the flow of water into the evaporator: partially close the output tap from the chiller and restart the machine.
Operate the chiller under these conditions until the water temperature gradually returns within operating limits; then, you can turn on the tap completely.

4.3 Turning off the unit

To turn off the chiller, hold down the **UP** ↑ (3) button on the electronic controller for at least 5 seconds or, move the run/stop I/O/REM switch to the O position (see paragraph 5.2, Turning on and off).

Attention: it is important not to turn the unit off using the main power supply switch or the cut-off on the machine's electrical panel because this would not provide for the delayed power-off of the pump regarding the power-off of the compressors, with the risk of damaging the evaporator; in addition, it would prevent the functioning of the heating elements in the compressor housing.

5.0 ELECTRONIC CONTROLLER



Electronic controller

The electronic controller has two 7-segment displays and a series of icons: it

manages:

- the functioning of the compressors to ensure that the water produced has a constant temperature
- the functioning of the pump
- the speed of the fans
- the prevention of the high-pressure alarm (CWT 25÷130)

displays:

- the state of the unit (❄ icon) (7)
- the state of the compressors (4 compressor icons) (9)
- the state of the fans (fan icon) (11)
- the state of the pump (pump icon) (10)
- the temperature set point (display B) (5)
- the temperature of the water produced (display A) (6)
- all digital and analogue inputs and outputs (parameters navigation, through displays A and B)

displays the following alarms:

- water differential pressure switch
- high-pressure pressure switch
- low-pressure pressure switch
- anti-freeze thermostat
- compressor protection - wrong R-S-T phase sequence
- pump and fan protection - water level in tank insufficient
- pressure and temperature probe failure

5.1 Main functions of the electronic controller buttons and meanings of the icons

No.	Button/Icon	Functions
1.	**ENTER** ↵	Accesses the menu. Goes to the next menu level. Goes to the mode for editing the selected parameter. Confirms value entered for a parameter.
2.	**X ESC**	Accesses the list of active alarms. When navigating the menus, returns to the previous menu level (pressed once). When navigating the menus, returns to the main page (pressed several times). Exits from parameter edit mode without saving the changes made.
3.	**UP** ↑	When pressed for at least 5 seconds, turns the unit on and off. During menu navigation, scrolls up through the menu items. Increases the value of the parameter being modified. Scrolls up through the alarm list.
4.	**DOWN** ↓	During menu navigation, scrolls down through the menu items. Decreases the value of the parameter being modified. Scrolls down through the alarm list.
5.	DISPLAY A	During the machine's operation, shows the temperature of the water exiting the evaporator. During navigation of the menu, indicates the directory above the one where you are.
6.	DISPLAY B	During the machine's operation shows the temperature set point for the water. During navigation of the menu, indicates the directory where you are. When modifying a parameter, the value to be modified is displayed flashing.
7.	COOLING icon	Indicates that the machine is ON, even when the compressors are stopped.
8.	ALARM icon	Indicates the presence of one or more active alarms.
9.	COMPRESSOR icons 1, 2, 3, 4	They indicate the state of the compressors and, more precisely: Off: compressor OFF On: compressor ON Slow flashing: compressor about to turn on. Fast flashing: compressor about to turn off.
10.	PUMP icon	Indicates the state of the pump, more precisely: Off: pump OFF On: pump ON Fast flashing: pump about to turn off.
11.	FAN icon	Indicates the state of the fans: On: fans ON Off: fans OFF.
12.	HEATING ELEMENT icon	Not used.
13.	DEFROSTING icon	Not used.

5.2 Turning on and off

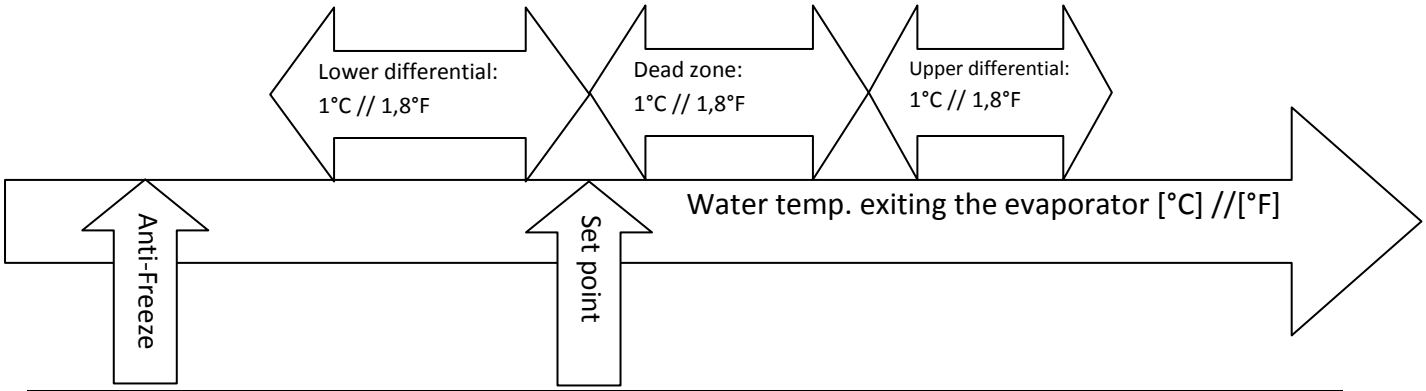
To turn the unit on, hold down the **UP** ↑ button (3) for more than five seconds
To turn the unit off, hold down the **UP** ↑ button (3) for more than five seconds
Optionally, once the machine has been turned on using the electronic controller, it can be turned on and off from the run/stop switch (I/O/REM) on the door of the electrical panel.

Attention: the run/stop I/O/REM switch has precedence over the ↑ "**UP**" button (3): after turning the machine office from the run/stop I/O/REM switch, it will not be possible to restart it with the ↑"**UP**" button (3) on the electronic controller.

5.3 Water temperature: dead-zone regulation

The machines have a temperature probe at the exit from the evaporator: based on this temperature, the electronic controller starts and stops the compressors to keep this temperature as close as possible to the temperature set point.

The electronic controller regulates the exit temperature of the evaporator using a dead-zone system: this system is based on three temperature intervals: lower differential - dead zone - upper differential and two temperature values: the set point and anti-freeze.
All these values are distributed on the temperature scale as shown in the figure:



Anti-Freeze	Lower differential	Set point	Dead zone	Upper differential	
Below this value, the compressors are forced off to avoid the formation of ice.	In this interval, the compressors are progressively turned off as the temperature of the water decreases:		In this interval, the compressors that are on are kept on and those that are off are kept off.	In this interval, the compressors are progressively turned on as the temperature of the water increases:	All the compressors are on.
		Numeric examples:			
3°C // 37,4°F	From 6°C//42,8°F to 7°C//44,6°F	**7**°C **44,6**°F	From 7°C//44,6°F to 8°C//46,4°F	From 8°C//46,4°F to 9°C//48,2°F	Above 9°C//48,2°F
3°C // 37,4°F	From 9°C//48,2°F to 10°C//50°F	**10**°C **50**°F	From 10°C//50°F to 11°C//51,8	From 11°C//51,8°F to 12°C//53,6°F	Above 12°C//53,6°F

The set point of the water can be changed: the other parameters (differentials and dead zone) remain constant and follow the set-point value, moving on the temperature scale (see the numeric examples in the table above).

5.4 Changing the set point

If, during the offer phase, you did not specify that the chiller must produce water at temperatures close to 0°C//32°F, or below, you must contact our company. See paragraph 7.1, Low water temperatures.

To change the set point of the exiting water, proceed as follows:
from the main screen, press **ENTER** ↵ use the **DOWN** ↓button to go to the PAR menu. Press **ENTER** ↵ and use the **DOWN** ↓ button to go to the REG menu. Press **ENTER** ↵. In the REG SET menu, press **ENTER** ↵ and the set point will be displayed. To change it, press **ENTER** ↵ and the value will flash. Use the **UP** ↑ and **DOWN** ↓ buttons to set the desired value. To confirm it, press **ENTER** ↵. To exit without saving it, press **X ESC.**
Press **X ESC** again until you return to the main screen.

5.6 Changing the type of restart after a power failure

In the case of a power failure, the chiller can behave in three different ways when power is restored:

- stay off,
- start,
- return to the same condition it was in when the power failed.

To select one of these options, proceed as follows:

From the main screen, press **ENTER** ↵. Use the **DOWN** ↓ to go to the PAR menu. Press **ENTER**↵ . Go to the PAR GEN menu. Press **ENTER** ↵. In the GEN STU menu, press **ENTER** ↵. In the Y02 menu, the type of restart currently set will be displayed, which can be one of the following:

- EQUA: when the power returns, the machine will work in the same way as before the power failed.
- ON: when the power returns, the machine will start.
- OFF: when the power returns, the machine will stay off.

To change the type of restart, press **ENTER** ↵ and the parameter begins to flash. Use the **UP**↑ and **DOWN**↓ buttons to select the desired parameter and confirms with **ENTER** ↵.
To return to the main screen, press **X ESC** four times.

5.7 Changing the serial address (MODBUS and CAN)

If you are installing a serial network with several devices, it may be necessary to change the serial address of the electronic controller, which is set to 1 at the factory.

From main screen, press **ENTER** ↵. Using the **DOWN**↓ button, go the PAR menu. Press **ENTER** ↵. In the PAR GEN menu, press **ENTER** ↵. Use the **DOWN**↓ arrow to scroll to the GEN SER menu and press **ENTER** ↵: the current serial address is displayed. From the SER menu, press **ENTER** ↵: the current value will flash. Use the **UP**↑ and **DOWN**↓ arrows to set the desired value.
To return to the main screen, press **X ESC** four times.

5.8 Display of inputs and outputs

It is possible to display the analogue and digital outputs to check the operation of the machine and its main components.
From the main screen, press **ENTER**↵. Use the **DOWN**↓ button to move to the I/O menu. From here, press **ENTER**↵ to access the I/O IOd menu. Press **ENTER** ↵and, using the **UP**↑ and **DOWN**↓ buttons, you can display all the values of the analogue and digital inputs and outputs.
Press **X ESC** again until you return to the main screen.
The following values can be displayed:

Input/Output	Description	Unit of measure/Key
AI 1 - analogue input 1	Temperature at the entrance of the machine	°C
AI 2 - analogue input 2	- Temperature at the exit of the machine	°C
AI 3 - analogue input 3	Not used	-
AI 4 - analogue input 4	Pressure of condenser circuit 1	Bar g
AI 11 - analogue input 11	Pressure of condenser circuit 2 (only for models 75÷130)	Bar g
AO 1 - analogue output 1	Fan speed	0÷100%
AO 2 - analogue output 2	Not used	-
DI 1 - digital input 1	Chiller on/off from run/stop switch (I/O/REM)	0=on, 1 = off
DI 2 - digital input 2	High-pressure pressure switch circuit 1	0=OK; 1=pressure switch intervention
DI 3 - digital input 3	Low-pressure pressure switch circuit 1	0=OK; 1=pressure switch intervention
DI 4 - digital input 4	Evaporator flow differential pressure switch	0=OK; 1=pressure switch intervention
DI 5 - digital input 5	Compressor and/or phase-sequence protection circuit 1	0=OK; 1=protection intervention
DI 6 - digital input 6	Water level, pump and/or fan protection	0=OK; 1=protection intervention
DI 11 - digital input 11	High-pressure pressure switch circuit 2 (only for models 75÷130)	0=OK; 1=pressure switch intervention
DI 12 - digital input 12	Low-pressure pressure switch circuit 2 (only for models 75÷130)	0=OK; 1=pressure switch intervention
DI 13 - digital input 13	Compressor protection circuit 2 (only for models 75÷130)	0=OK; 1=protection intervention
DI 14 - digital input 14	Phase-sequence protection circuit 2 (only for models 75÷130)	0=OK; 1=protection intervention
DO 1 - digital output 1	Alarm present	0=no alarm; 1=alarm
DO 2 - digital output 2	Compressor (Compressors 1 and 2 (only for models 90÷130)	0=off; 1=on
DO 3 - digital output 3	Compressor (Compressor 3 (only for models 90÷130)	0=off; 1=on
DO 4 - digital output 4	Compressor	0=off; 1=on
DO 5 - digital output 5	Pump	0=off; 1=on
DO 6 - digital output 6	Compressor 4 (only for model 75; not used on other models)	0=off; 1=on
DO 11 - digital output 11	Compressors 4 and 5 (only for models 90÷130)	0=off; 1=on
DO 12 - digital output 12	Compressor 6 (only for models 90÷130)	0=off; 1=on

5.9 Displaying the software release version of the electronic controller

From the main screen, press **ENTER** ↵. Use the **DOWN**↓ button to go to the SER menu. Press **ENTER** ↵. From the SER INF menu, press **ENTER** ↵ and here you can display the version of the software release installed in your controller. Press **X ESC** again until you return to the main screen.

5.10 Displaying the compressor and pump counters

From the main screen, press **ENTER** ↵. Use the **DOWN**↓ button to go to the HRS menu. Press **ENTER** ↵. In the HRS COH menu, press **ENTER** ↵. Use the arrows to display the working hours of the compressors (C01 C02, etc.).

To display the working hours of the pump, after going to the HRS COH menu, use the **DOWN** ↓ button to scroll down to the HRS EPH menu and press **ENTER** ↵. From here you can display the working hours of the pump (EP1). To exit, Press **X ESC** again until you return to the main screen.

5.11 Alarms

An alarm condition is signalled by the Alarm icon (8).
Some alarms must be rearmed manually while for others, the reset is automatic or semi-automatic.

- **Manual reset:** these alarms must be reset, which can only be done when the alarm condition no longer exists; only then can the machine resume operation.
- **Automatic reset:** the alarm is automatically deactivated as soon as the alarm condition ceases and the machine restarts by itself. However, the signal (Alarm icon (8)) remains on the display until the alarm code is displayed**.**
- **Semi-automatic reset:** semi-automatic alarms behave like automatic alarms; but if the same semi-automatic alarm occurs 5 times in 90 minutes, that alarm becomes a manual alarm; therefore to restart the machine, you will have to remove the cause of the alarm and reset it.

5.11.1 Displaying and resetting alarms

The Alarm icon (8) turns on to indicate an alarm.
To display the code of the alarm that intervened, press the **X ESC** button; use the **UP**↑ and **DOWN** ↓ buttons to display the codes of any other alarms that intervened at the same time.

To reset an alarm, the condition that caused it must no longer exist: for example, if the low-pressure pressure switch has intervened, the alarm can only be reset when the pressure has risen beyond the reset value (see paragraph 6.1, Calibrating security devices and type of rearm).
Then, after displaying the alarm, wait for normal conditions to be restored, press **X ESC** again, hold it down for 5 seconds and the alarm will be reset.

5.11.2 Table of alarm codes

Alarm code		Alarm description	
CWT 7 ÷ 65	**CWT 75÷130**		**Type of reset**
A03	A03	Evaporator differential pressure switch	Semi-Automatic
AP1	AP1	Pump magnetothermic circuit breaker, water level insufficient and/or ventilator thermal protection	Manual
AH0	AH1	High refrigerant pressure circuit 1	Manual
AL0	AL1	Low refrigerant pressure circuit 1	Automatic
	AH2	High refrigerant pressure circuit 2	Manual
	AL2	Low refrigerant pressure circuit 2	Automatic
	A02	Phase-sequence alarm	Automatic
	AC1	Magnetothermic compressor circuit breaker circuit 1	Manual
	AC2	Magnetothermic compressor circuit breaker circuit 2	Manual
AC0		Magnetothermic compressor circuit breaker and/or wrong phase sequence	Manual
A71	A71	Entering water temperature probe failure	Automatic
A72	A72	Exiting water temperature probe failure	Automatic
A74	A74	Refrigerant pressure transducer failure circuit 1	Automatic
	A75	Refrigerant pressure transducer failure circuit 2	Automatic
A09	A09	High exiting water temperature warning	Automatic
AE1	AE1	Anti-freeze alarm	Automatic

6.0 SAFETY DEVICES

CWT chillers have a series of safety devices that limit the machine's temperature and pressure values to ensure that it operates within the anticipated limits and to avoid dangerous situations.
Here is a list of dangerous situations, including the relative safety device and its location.

Dangerous situation	Safety device	Location
High condensation pressure	High-pressure pressure switch	Compressor output pipe
High condensation pressure	High-pressure prevention system (CWT 25÷130)	Electronic controller
Low evaporation pressure	Low-pressure pressure switch	Compressor intake pipe
Low water flow-capacity	Water differential pressure switch	Plate evaporator
Low water temperature	Anti-freeze thermostat	Water exit from the plate evaporator
High water pressure	Safety valve	Accumulation tank
Frequent compressor start-ups	Anti-circulation timer	Electronic controller
Low water level in the tank	Water-level sensor	Tank

When they reach their calibration value, most of the security devices trigger an alarm managed by the electronic controller.

For some safety devices, once the cause of the alarm times out, the machine resumes operation automatically as soon as the reset value is reached. Others must be manually reset to restart the machine (also see paragraph 5.11, Alarms)

The following paragraph lists the characteristics of each safety device.

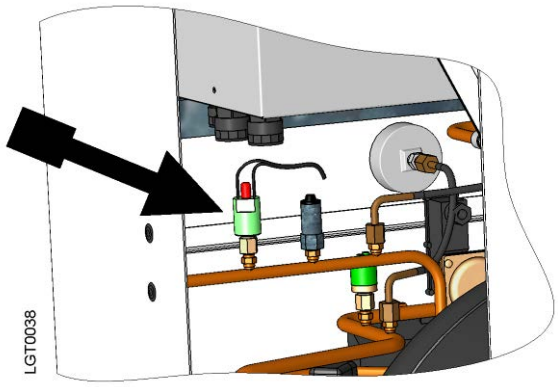
6.1 Calibration of the safety devices and type of rearm

Safety device	Intervention value	Reset value	Type of rearm
High-pressure pressure switch	41,5 barg // 602 psi	33 barg // 478 psi	Manual
High-pressure prevention*	40 barg // 580 psi	37 barg // 536 psi	Automatic
Low-pressure pressure switch	1,7 barg // 25 psi	2,7 barg // 39 psi	Automatic
Water differential pressure switch	18 mbar // 0,25 psi	25 mbar // 0,36 psi	Semi-Automatic
Anti-freeze thermostat	3°C // 37,4°F	6°C // 42,8°F	Automatic
Water safety valve	6 barg // 87 psi	--	--
Anti-circulation timer**	3 min.	--	--

- *Only active on units with more than one compressor (CWT25÷130): consists in reducing the number of functioning compressors to 1 until the condensation pressure falls below the reset value again.
- **This is a function of the electronic controller that prevents the same compressor from stopping and starting too frequently: at least 3 minutes must elapse between one compressor's power up and the next.

6.2 Resetting the high-pressure pressure switch

The intervention of the high-pressure pressure switch is the only case in which, in addition to manually rearming the electronic controller, it is also necessary to reset the pressure switch itself.
The high-pressure pressure switch is located in the compressor compartment on the uninsulated copper pipe that goes from the compressors to the condensation batteries; there is a manual-rearm button on top of it. This can only be rearmed when the pressure in the circuit has fallen below the reset value (see table, "Calibration of the safety devices and type of rearm" in paragraph 6.1).



High-pressure pressure switch

For this reason, when dealing with an intervention of the high-pressure switch, it is necessary to:

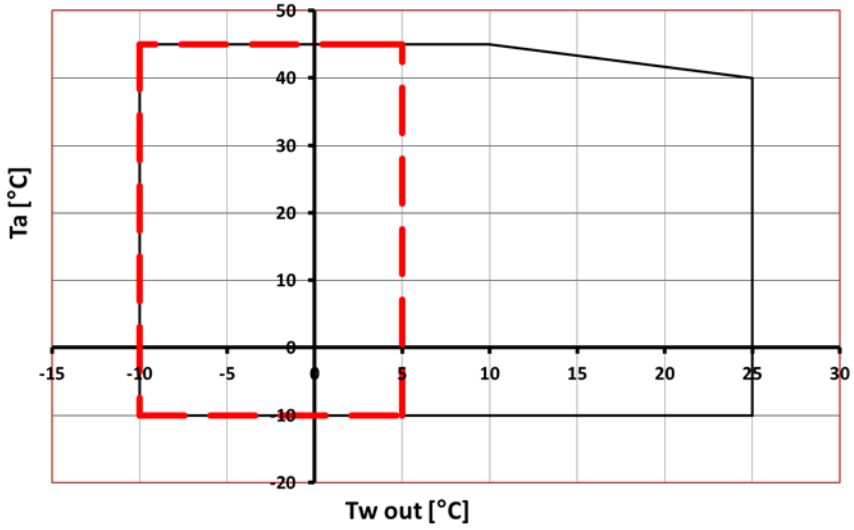
A) identify the cause of the rise in pressure (fans not working, condensation batteries dirty or obstructed, obstacles to the flow of exiting air, operating temperature outside operating limits, etc. – also see Chapter 9.0, Trouble shooting) and remove the cause, if possible;
B) wait until the high-pressure manometer falls below the reset value (see the table, "Calibration of the safety devices and type of rearm" in paragraph 6.1);
C) rearm the pressure switch by pressing the red button: if you do not hear a click, it is not rearmed.
D) then, rearm the electronic controller: press **X ESC** once (alarm code AH1 or AH2 is displayed). Then press it again and hold it down for at least 5 seconds.

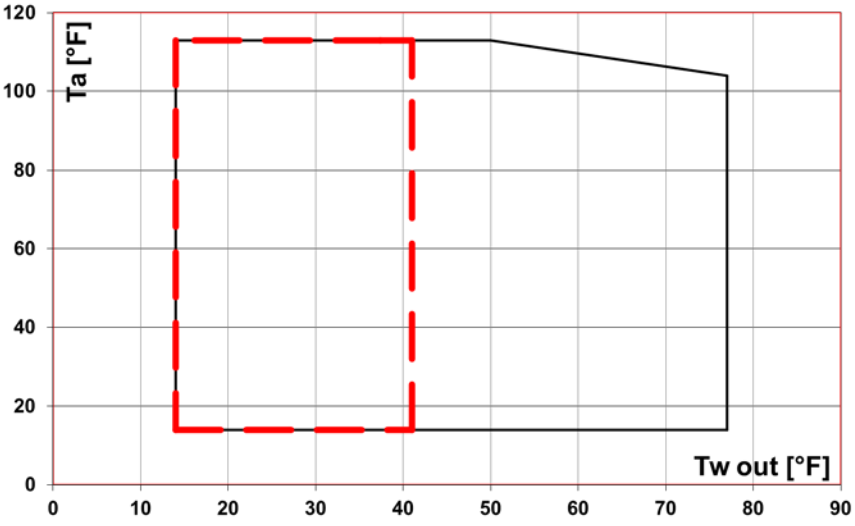
Attention: the high-pressure switch stops the compressors while it keeps the condenser fans running to lower the pressure in the condensers

7.0 OPERATING LIMITS

CWT series units feature broad operating limits in relation to the temperature of the outside air, thanks to the condensation control (also see paragraph 2.4); they are also prepared to produce water at low temperature: in this case, it is necessary to contact our company (see paragraph 7.1 Negative water temperatures).

The graphs show the continuous operating limits of CWT units in relation to the temperature of the water exiting the machine (Tw out [°C] // [°F]) and the temperature of the outside air (Ta [°C] // [°F]).





Attention: the dotted line indicates the need to use an ethylene glycol mixture and set adequate parameters in the electronic controller (see paragraph 7.1).

7.1 Low water temperatures (<32°F)

If it was not anticipated that the chiller unit offered was to produce water at temperatures close to 0°C // 32°F, or below, you should contact our company.

To achieve temperatures that are negative, or near zero, it is necessary to use anti-freeze (ethylene glycol) in percentages that depend on the desired temperature; it is also necessary to change the calibration of the anti-freeze thermostat

NOTE The anti-freeze thermostat setting can only be changed at a higher level of programming of the electronic control: please request the password by contacting our company.

7.1.1 Changing the setting of the anti-freeze thermostat

Please ask our company for the password for changing the parameters.
From the main screen, press **ENTER** ↵: the word LOG is displayed
press **ENTER** ↵: the text PAS 0 - - - is displayed; enter the first of the four digits of the password using the **UP**↑ and **DOWN**↓ buttons; then press **ENTER** ↵; do the same for the other three digits: the word LOG is displayed.
Use the **DOWN**↓ button to scroll the menu until the text PAr is displayed; press **ENTER** ↵: the text PAr GEN is displayed.
Use the **DOWN**↓ button to scroll the menu until the text ALA is displayed; press **ENTER** ↵: the text ALA CFG is displayed.
Use the **DOWN**↓ button to scroll the menu until the text ALA ICE is displayed; press **ENTER** ↵: the text AIS is displayed with the current setting of the anti-freeze thermostat alongside (the factory setting is 3.0).
Press **ENTER** ↵ again and the set value will begin to flash: select the recommended value using the **UP**↑ and **DOWN**↓ buttons. (see table in paragraph 7.1.2, Recommended glycol percentages for operating with negative temperatures).
After selecting the value, confirm it by pressing **ENTER** ↵
Exit by pressing **X ESC** several times until you return to the main screen.

7.1.2 Recommended glycol percentages for operating with low water temperatures

The table below shows the percentage of glycol required and the setting of the anti-freeze alarm for each temperature of water produced.

Temperature of the water produced set point [°C]	-10	-7	-5	-3	0	2	5	≥6
Anti-freeze alarm setting [°C]	-14	-9	-9	-5	-2	1	1	3
Temperature of the water produced set point [°F]	14	19,4	23	26,6	32	35,6	41	42,8
Anti-freeze alarm setting [°F]	6,8	15,8	15,8	23	28,4	33,8	33,8	37,4
Percentage of ethylene glycol [%]	30	30	30	25	20	15	15	0

CWT units can operate with water and ethylene glycol mixtures up to a concentration of 30%.

8.0 MAINTENANCE AND INSPECTIONS AND PERIODIC CHECKS

	To keep the machine running properly and providing the guaranteed performance required, it is necessary to make some periodic checks

Operation	Frequency	Execution
Check that the temperature of the water produced is in the required interval.	Daily	User
Check for the presence of any alarm signals.	Daily	
Check the functioning of the fans.	Monthly	
Check the pressure of the water circuit with the pump stopped (verify that it is about 1 bar // 15 psi)	Monthly	
Check that the temperature of the air is compatible with the operating limits of the machine.	Monthly	
Clean the air filters.	Monthly(1)	
Clean the condensation batteries with a jet of compressed air.	Yearly (1)	
Clean the water filter.	Monthly(2)	Specialised personnel
Check that the refrigerant liquid peep hole is clear or, at most, with a few bubbles (check with the compressor running).	Every 6 months	
Check that the undercooling and superheating values are, respectively between 3÷5K // 5,4÷9°F and 5÷7K // 9÷12,6°F.	Every 6 months	
Check for traces of oil on the pipes of the chilling circuit (symptom of refrigerant leaks)	Every 6 months	
Check the tightness of the electrical terminals both inside the electrical panel and on the terminal strips of the compressors.	Yearly	
Check the contacts of the remote switches; if they show signs of deterioration, replace them.	Yearly	
Check that the current absorbed by the machine is within the values on the identification plate.	Every 6 months	
If the unit will not be used for a long time, drain the water from the pipes and the machine to avoid the formation of ice during the winter (3).	Extraordinary	User

(1) It may be necessary to carry this out more frequently in the case of particularly dirty environments.
(2) We recommend an extraordinary cleaning of the filter after the machine has been operating for the first week.
(3) It is not necessary to do this if the system has been charged with an anti-freeze solution (water and a suitable percentage of glycol) (see paragraph 3.4.2, Use of ethylene glycol as a winter anti-freeze)

Attention! Before carrying out any maintenance on the unit or accessing internal parts, make sure you have cut-off the electricity.

Attention! The upper part of the compressor housing and the output pipe are hot. Be especially careful when working near them

9.0 TROUBLESHOOTING

Symptom	Possible cause	Possible alarm signal on the electronic controller or other symptom	Solution	Execution
A) The unit does not start	Contacts of the main differential switch are open	Electronic controller off	Close the contacts	User
	Unit's electrical panel cut-off switch are open	Electronic controller off	Close the contacts	User
	I/O/REM switch in the O or REM position	Electronic controller on	Move the switch to I	User
	No consent from the water differential switch	A03	Check the functioning of the pump, vent the system.	User
	Compressor timer active	The compressor icon on the display of the electronic controller is flashing	Wait 3 minutes	User
	No consent from the service thermostat	System water at temperature (see display A)	Apply a thermal load to the machine or lower the set point	User
	No consent from the anti-freeze thermostat	AE1	Reset a temperature of the water (set point) compatible with the calibration of the anti-freeze thermostat (see table in paragraph 7.1.2)	User
	Service and anti-freeze probe defective	A72	Check contacts and replace, if necessary	Specialised personnel
	Entering water temperature probe defective	A71	Check contacts and replace, if necessary	Specialised personnel
	Intervention of the main differential switch	Electronic controller off	Look for current leakage inside the machine	Specialised personnel

Symptom	Possible cause	Possible alarm signal on the electronic controller or other symptom	Solution	Execution
B) The compressor doesn't start	Intervention of the thermal protection inside the compressor	The remote switch of the compressor is on but the compressor is stopped	Wait for cooling: check that the compressor is working under normal conditions Check for insufficient refrigerant in the circuit (see point H)	Specialised personnel
	Magnetothermic protection of the compressor open (QC1, QC2, etc.)	AC0 (for CWT 7÷65) AC1 (for CWT 75÷130 circuit 1) AC2 (for CWT 75÷130 circuit 2)	Look for short circuits in the motor windings of the compressors Check for possible over-absorption of current due to too low voltage; combined with operating conditions near the limits: check the power supply voltage and operating conditions	Specialised personnel
	Intervention of the phase-sequence relay	AC0 (for CWT 7÷65) A02 (for CWT 75÷130)	Reverse the two phases upstream from the cut-off switch of the unit's electrical panel (see paragraph 4.2)	Specialised personnel
	Contactor of the compressor open	The compressor icon is on but the compressor is stopped	Check the voltage at the coil of the remote switch of the compressor and the continuity of the coil itself	Specialised personnel
C) Intervention of the high-pressure pressure switch	Condenser obstructed or insufficient air flow-capacity	AH0 (for CWT 7÷65) AH1 (for CWT 75÷130 circuit 1) AH2 (for CWT 75÷130 circuit 2)	Remove dirt from the condenser and any obstacles to the flow of air. Wait for the pressure to drop below the reset value (33 bar g), then rearm the high-pressure pressure switch by pressing the button on top of it (see figure in paragraph 6.2)	User
	The unit has operated outside its operating limits (such as air or water too hot)	AH0 (for CWT 7÷65) AH1 (for CWT 75÷130 circuit 1) AH2 (for CWT 75÷130 circuit 2)	If possible, restore conditions that are compatible with the operating limits. Rearm the pressure switch (paragraph 6.2)	User

Symptom	Possible cause	Possible alarm signal on the electronic controller or other symptom	Solution	Execution
Continued C) Intervention of the high-pressure pressure switch	Fan not working		See point F	
	Excessive refrigerant charge	High undercooling (greater than 10K // 18°F)	Drain excess gas	Specialised personnel
	Presence of air or incondensable gas in the refrigerant circuit	Presence of bubbles on the flow peep hole, also with undercooling values greater than 5K // 9°F.	Drain the circuit, create vacuum and recharge	Specialised personnel
	Coolant filter clogged or thermostatic valve stuck	Pipe downstream from the component covered with frost.	Check and replace	Specialised personnel
D) Intervention of the water differential pressure switch	Taps of the machine are turned off	A03	Open the taps	User
	Water circulation pump blocked or defective	A03	Unlock or replace the pump	Specialised personnel
	Circulation pump stopped	A03 Pump icon lit.	Check the voltage at the coil of the contactor of the pump and the continuity of the coil itself	Specialised personnel

Symptom	Possible cause	Possible alarm signal on the electronic controller or other symptom	Solution	Execution
E) Intervention of the low-pressure pressure switch	Refrigerant filter clogged or thermostatic valve stuck	Pipe downstream from the component covered with frost	Check and replace	Specialised personnel
	Insufficient refrigerant charge		See point H	
F) Fans don't start	Very low outside air temperatures and consequent intervention of the condensation control	Fan icon off. Condensation pressure normal	The machine can work anyway	
	No voltage output from the fan-speed regulator	Fan icon on and fans stopped	Check the voltage output from the regulator and replace, if necessary	Specialised personnel
	Intervention of the thermal protection inside the fan	AP1	Check that the working conditions of the machine (outside air temperature) are compatible with the operating limits. Wait for the fan motor to cool.	User
	Fan fuse blown	Fan icon on and fans stopped	Look for short circuits in the motor windings of the fans. Check the resistance to rolling of the fan roller bearings.	Specialised personnel
	Electrical connections of the fans loose	Fan icon on and fans stopped	Check and tighten	Specialised personnel

Symptom	Possible cause	Possible alarm signal on the electronic controller or other symptom	Solution	Execution
G) The unit is working without ever stopping	Excessive thermal load		Reduce the thermal load. Reduce the temperature of the incoming water and/or the flow-capacity of the water by closing the exit tap of the unit a little	User
	No refrigerant		See point H	
H) Compressor intake pipe covered with frost	No refrigerant	High overheating, low undercooling and high output temperature of the compressor. Traces of oil on the chilling circuit.	Check the chiller circuit with a leak detector. Repair any ruptures and recharge the circuit.	Specialised personnel
I) The pump doesn't start Magnetothermic protection of the pump open	Excessive water flow-capacity; the pump is absorbing too much current.	AP1	Reduce the flow-capacity of the water by closing the output tap of the pump a little bit. Rearm the thermomagnetic protection of pump QP1	User
	Short circuit or overcurrent	AP1	Look for a short circuit in the winding of the pump motor. Check for possible over-absorption of current due to too low voltage; check the power supply voltage	Specialised personnel

10.0 DISMANTLING THE CHILLER

If the chiller is being dismantled, you must separate it into parts of homogeneous material.
The following table lists the main materials of the various components of the machine.

Part	Material
Refrigerant fluid	R410A, Oil
Panelling and supports	Carbon steel, epoxy paint
Chiller compressor	Steel, Copper, Aluminium, Oil
Plate exchanger (evaporator)	Steel, Copper
Condenser	Aluminium, Carbon Steel
Pipes	Copper
Fan	Aluminium, Copper, Steel
Valves	Steel, Bronze
Insulation	Synthetic rubber without CFC, EPS, Polyurethane
Electrical wires	Copper, PVC
Electrical parts	PVC, Copper, Bronze

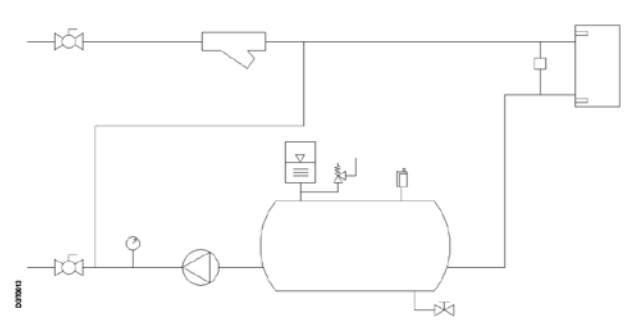
We recommend that you follow current safety norms for the disposal of each single material.
The refrigerant contains particles of lubrication oil from the chiller compressor.

Dispose of refrigerant properly. Remove it from the chiller with suitable tools and deliver it to authorised collection centres that will treat it and make it reusable

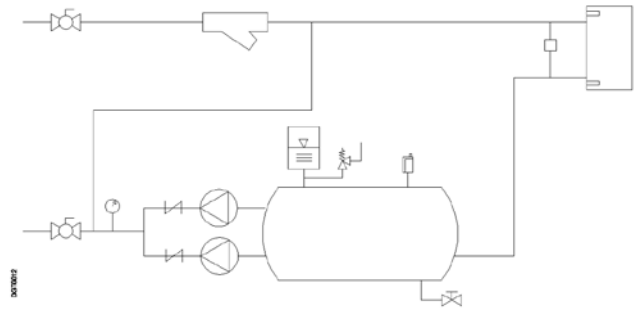
11.0 WATER DIAGRAMS

Key:

	Ball valve		Drain tap
	Mechanical filter		Evaporator
	Expansion vessel		Manometer
	Safety valve		Vent valve
	Pump		Differential pressure switch
	Check valve		



Version with single pump

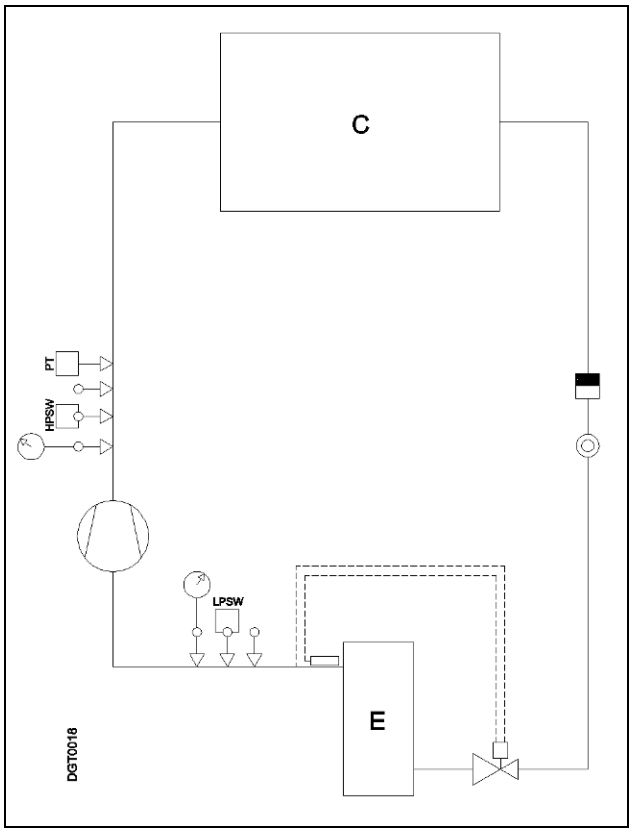


Version with double pump

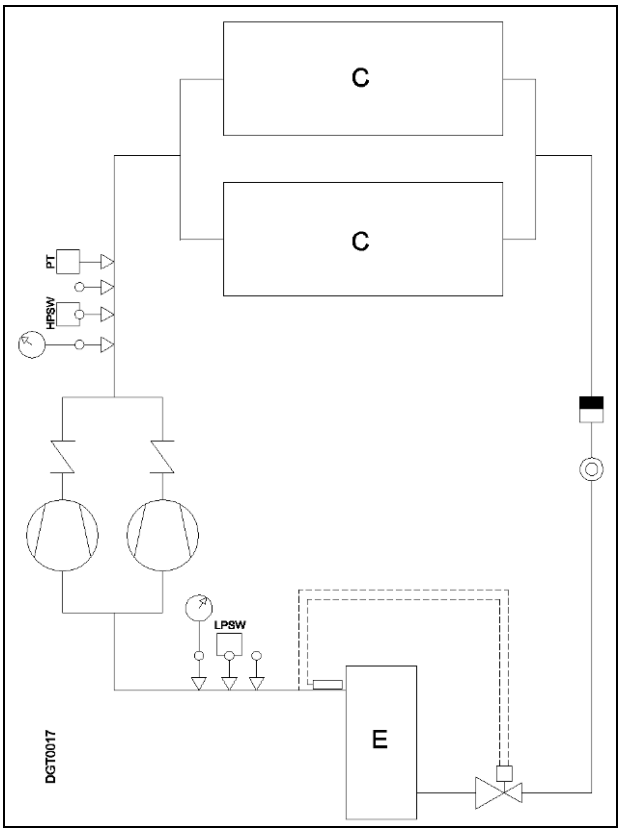
12.0 REFRIGERANT CIRCUITS DIAGRAMS

Key:

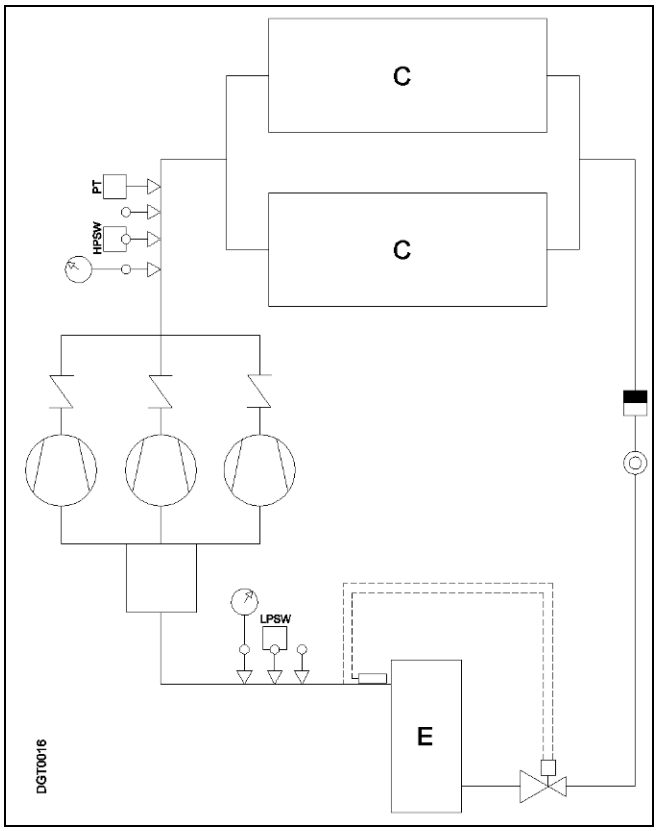
	Compressors		Flow peep hole
C	Condenser		Pressure outlet
	Expansion valve		Manometer
E	Evaporator	HPSW	High-pressure pressure switch
	Check valve	LPSW	Low-pressure pressure switch
	Refrigerant filter		



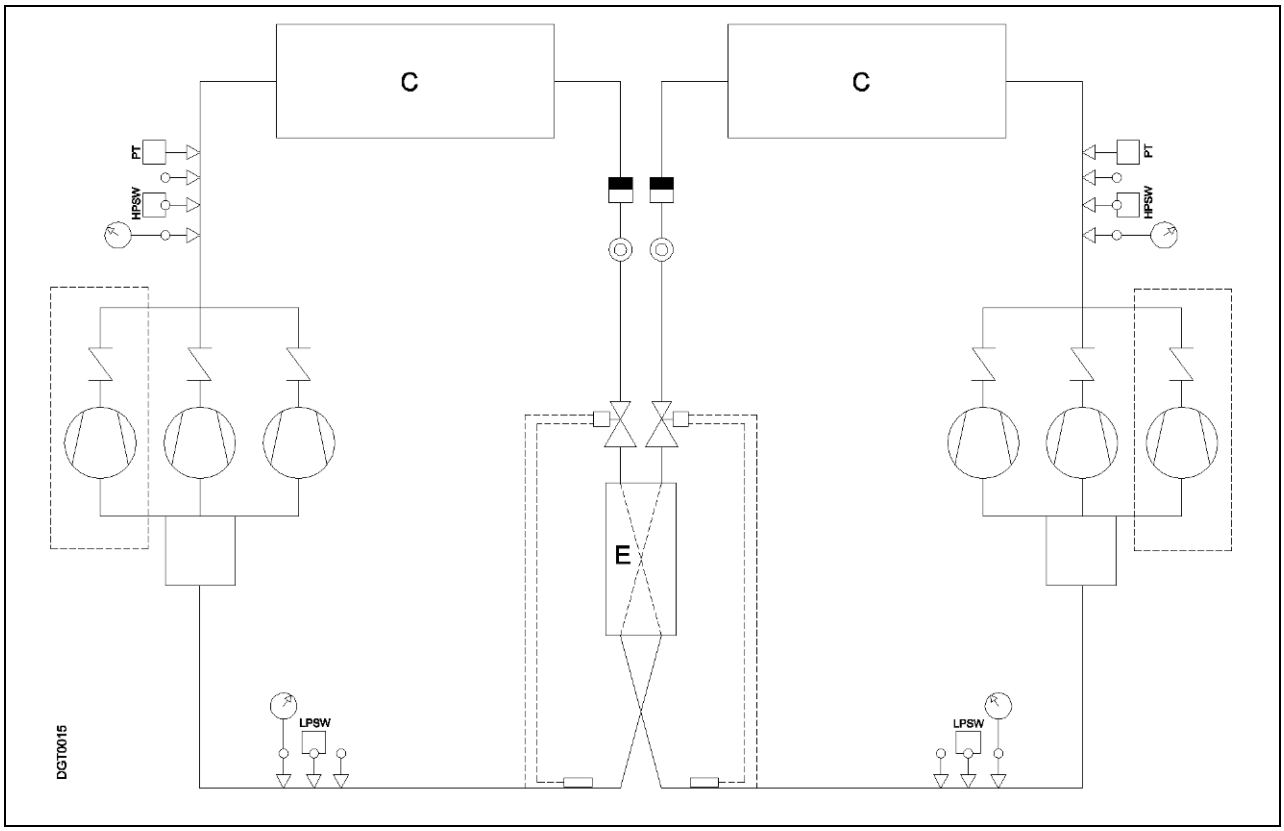
Refrigerant circuit diagram for CWT models 7÷20



Refrigerant circuit diagram for CWT models 25÷40

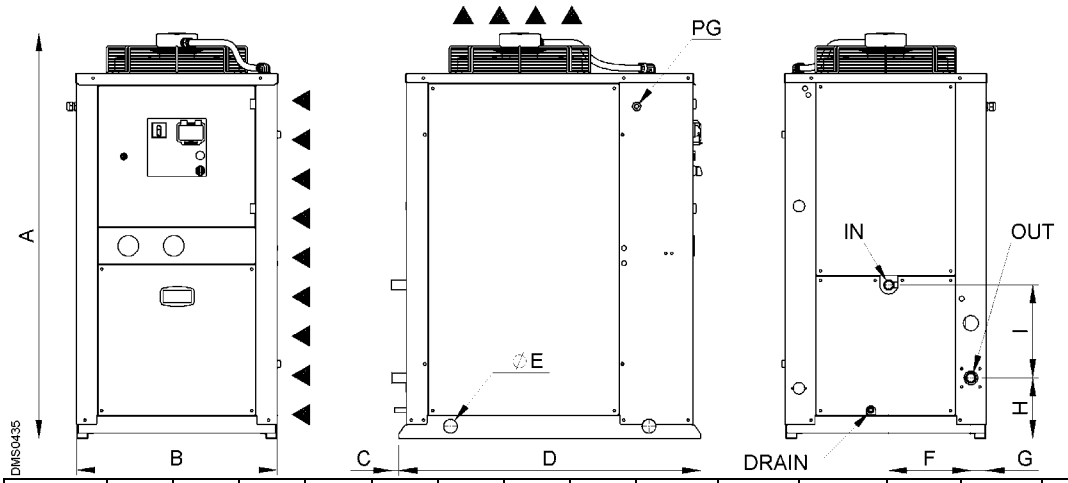


Refrigerant circuit diagram for CWT models 45÷65

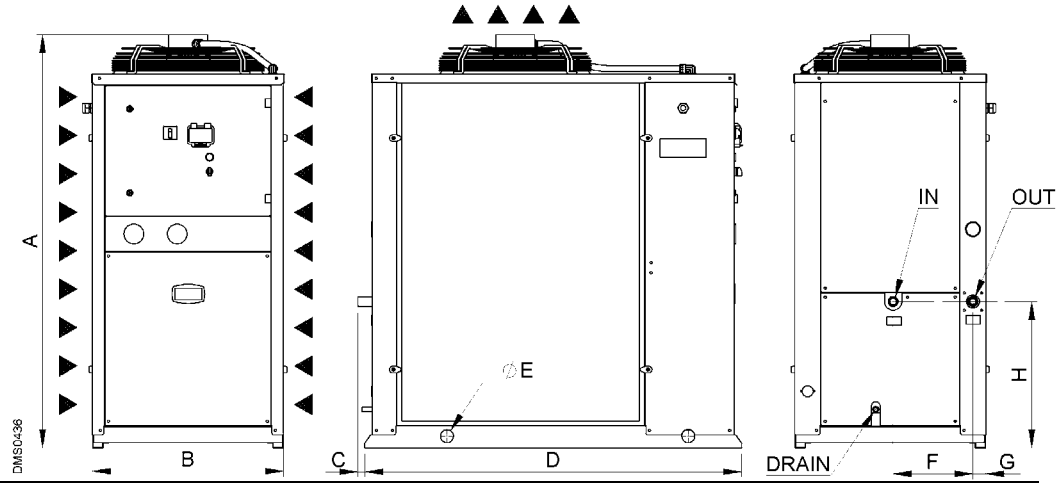


Refrigerant circuit diagram for CWT models 75÷130

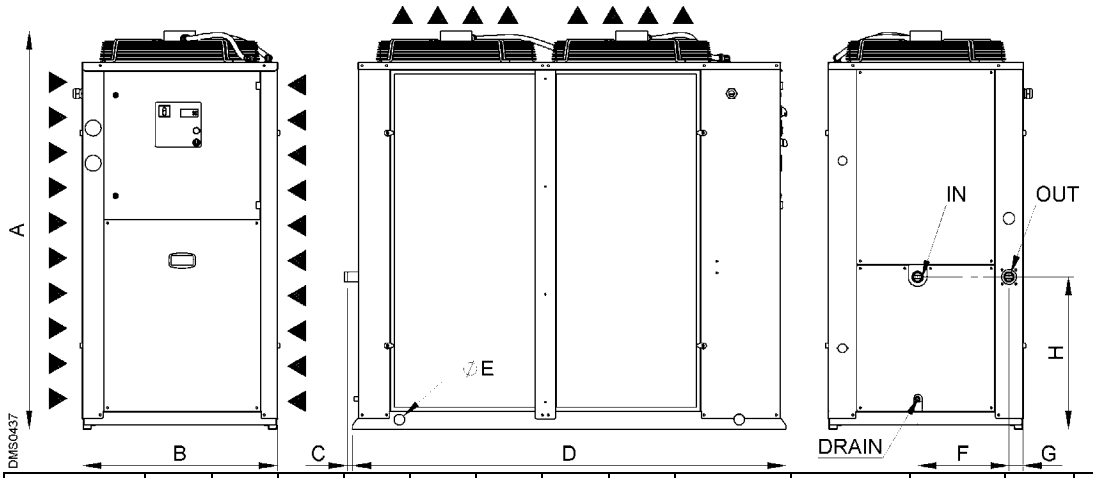
13.0 DIMENSIONAL DRAWINGS



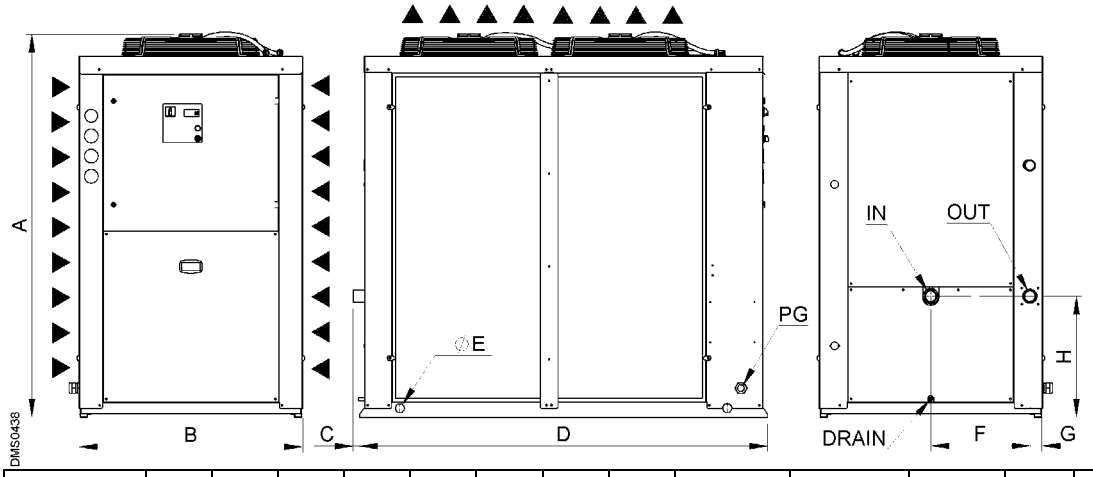
	A	B	C	D	E	F	G	H	I	IN	OUT	Drain	PG	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]				[mm]	[kg]
CWT007	1335	670	35	995	45	270	50	380	125	1” FF	1” FF	3/8”	16	210
CWT010	1335	670	35	995	45	270	50	380	125	1” FF	1” FF	3/8”	16	215
CWT015	1335	670	35	995	45	270	50	380	125	1” FF	1” FF	3/8”	16	260
	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]					[in]	[lb]
CWT007	52,6	26,4	1,4	39,2	1,8	10,6	2,0	15,0	4,9	1” FF	1” FF	3/8”	0,6	463
CWT010	52,6	26,4	1,4	39,2	1,8	10,6	2,0	15,0	4,9	1” FF	1” FF	3/8”	0,6	474
CWT015	52,6	26,4	1,4	39,2	1,8	10,6	2,0	15,0	4,9	1” FF	1” FF	3/8”	0,6	573



	A	B	C	D	E	F	G	H	IN	OUT	Drain	PG	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]				[mm]	[kg]
CWT018	1425	670	35	1205	45	275	45	505	1” FF	1” FF	3/8”	16	265
CWT020	1425	670	35	1205	45	275	45	505	1” FF	1” FF	3/8”	16	275
CWT025	1425	670	35	1205	45	275	45	505	1” FF	1” FF	3/8”	21	300
CWT030	1425	670	35	1205	45	275	45	505	1” FF	1” FF	3/8”	21	310
	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]				[in]	[lb]
CWT018	56,1	26,4	1,4	47,4	1,8	10,8	1,8	19,9	1” FF	1” FF	3/8”	0,6	584
CWT020	56,1	26,4	1,4	47,4	1,8	10,8	1,8	19,9	1” FF	1” FF	3/8”	0,6	606
CWT025	56,1	26,4	1,4	47,4	1,8	10,8	1,8	19,9	1” FF	1” FF	3/8”	0,8	661
CWT030	56,1	26,4	1,4	47,4	1,8	10,8	1,8	19,9	1” FF	1” FF	3/8”	0,8	683



	A	B	C	D	E	F	G	H	IN	OUT	Drain	PG	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]				[mm]	[kg]
CWT038	1535	750	35	1632	45	375	60	650	1"½ FF	1"½ FF	3/8"	21	400
CWT040	1535	750	35	1632	45	375	60	650	1"½ FF	1"½ FF	3/8"	21	410
CWT045	1705	835	35	1852	45	450	60	650	1"½ FF	1"½ FF	3/8"	29	480
CWT055	1705	835	35	1852	45	450	60	650	1"½ FF	1"½ FF	3/8"	29	500
CWT065	1705	835	35	1852	45	450	60	650	1"½ FF	1"½ FF	3/8"	29	515
	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]				[in]	[lb]
CWT038	60,4	29,5	1,4	64,3	1,8	14,8	2,4	25,6	1"½ FF	1"½ FF	3/8"	0,8	882
CWT040	60,4	29,5	1,4	64,3	1,8	14,8	2,4	25,6	1"½ FF	1"½ FF	3/8"	0,8	904
CWT045	67,1	32,9	1,4	72,9	1,8	17,7	2,4	25,6	1"½ FF	1"½ FF	3/8"	1,1	1058
CWT055	67,1	32,9	1,4	72,9	1,8	17,7	2,4	25,6	1"½ FF	1"½ FF	3/8"	1,1	1102
CWT065	67,1	32,9	1,4	72,9	1,8	17,7	2,4	25,6	1"½ FF	1"½ FF	3/8"	1,1	1135



	A	B	C	D	E	F	G	H	IN	OUT	Drain	PG	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]				[mm]	[kg]
CWT075	1900	1110	35	2025	45	495	60	600	2" FF	2" FF	3/8"	36	720
CWT090	1900	1110	35	2025	45	495	60	600	2" FF	2" FF	3/8"	36	770
CWT110	2180	1215	35	2230	45	545	60	600	2" FF	2" FF	3/8"	36	980
CWT130	2180	1215	35	2230	45	545	60	600	2" FF	2" FF	3/8"	36	1000
	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]				[in]	[lb]
CWT075	74,8	43,7	1,4	79,7	1,8	19,5	2,4	23,6	2" FF	2" FF	3/8"	1,4	1587
CWT090	74,8	43,7	1,4	79,7	1,8	19,5	2,4	23,6	2" FF	2" FF	3/8"	1,4	1698
CWT110	85,8	47,8	1,4	87,8	1,8	21,5	2,4	23,6	2" FF	2" FF	3/8"	1,4	2161
CWT130	85,8	47,8	1,4	87,8	1,8	21,5	2,4	23,6	2" FF	2" FF	3/8"	1,4	2205

CAG PURIFICATION INC. 3770B Laird Road, Unit 2,Mississauga, Ontario, L5L 0A7, Toll 1-800-951-0777 Fax 1-905-820-3490
info: chillers@cagpurification.com, web: www.cagpurification.com